C O P Y

ERNEST B. HUSSEY

Civil Engineer

Seattle, Washington

CONSULTING ENGINEER'S REPORT FOR MONTH OF

DECEMBER, 1930
and
ANNUAL REPORT FOR 1930

TO THE JOINT COMMISSION
INTER-COUNTY RIVER IMPROVEMENT
KING AND PIERCE COUNTIES, WASHINGTON

GENTLEMEN:-

Weather during December prevailed particularly fine for the steady progress of construction work in hand. Concrete revetment laying was continued up to the day before Christmas.

During January and February generally stormy weather prevailed, with abnormal temperatures. However, the balance of the year experienced generally ideal weather for the conduct of all character of construction work in hand in the province of this Improvement.

On the whole, a better climatic year for construction work involved could not have been desired.

Abnormally low rain-fall throughout the water-sheds of the rivers embraced in the Improvement resulted in extreme low discharge of the rivers.

This extreme low flow enabled the placing of brush mattresses at an unusual but highly desirable low elevation in respect to the beds of the rivers involved. This is a great advantage in assuring the prolongation of life of the brush mattresses so la'

MUCKLESHOOT SECTION:

In my report for August, 1929, a developed program agreed upon with the Chief Engineer, Mr. Gronen, provided for the cutting up and blasting into small pieces the stranded drift in White River, that otherwise might be a menace when carried lower down the river during flood periods. Also, the securing of certain other stranded drifts to anchorage by cable to the shore as bank protection. The work under that program commenced in October, 1929, was continued to its completion in March, 1930.

There was also constructed, during last spring and early summer, brush retards on the right and left bank of White River about a mile below the Drift Barrier. These were for requisite bank protection, as well as river course control.

As far as practicable, control works must be maintained so as to retain the flow in the present channel of White River. This in order to assure the flow, during extreme flood periods, to glide past the Diversion Dam in the Auburn Section; instead of impinging against said dam. Too great emphasis can not be expressed as to the vital urgency of thus maintaining the control of White River through the Muckleshoot Section.

A large amount of stranded drift of considerable magnitude is in White River above the limits of this Section; and above the scope of the work of the Inter-County River Improvement. The extent of said stranded drift reaches for many miles above the Drift Barrier. During flood periods a certain amount of said

stranded drift, depending upon the magnitude of the flood flowing downstream, will be a subject of more or less hazard until it has safely passed especially through the Auburn and County Line Sections.

Present conditions in this Section are reasonably safe to withstand the eventuality of a flood run-off. But the great menace of the large quantity of stranded drift, existing for miles above the Drift Barrier, might annul in a few moments, during an extreme flood, the present reasonably safe conditions in this Section for the passage of a flood run-off.

These existing masses of drift borne forward upon an extreme flood into and lodged in either the Muckleshoot or Auburn Sections could result in diverting the existing course of flow of the White and Stuck Rivers. The present control works and human energy would be nullified in a few minutes under circumstances conceived as capable of developing. The Drift Barrier is the up-stream limit of the Muckleshoot Section, and hence the up-stream limit of the province of the Inter-County River Improvement.

In view of this menacing hazard, it is my urgent recommendation that your Hon. Commission arrange for requisite authorization whereby the activities of the Inter-County River Improvement may be extended up-stream from the Drift Barrier. Such authorization to be to the extent at least of destroying, or anchoring, or rendering said stranded drift comparatively harmless for its carriage by floods down the rivers embraced within this improvement.

AUBURN SECTION:

Diesel engine and hoist No. 2 have been in steady operation in the removal of gravel from Stuck River, by drag-line scraper, and depositing the gravel as filling of old river channel adjacent to the right bank, and also as preliminary bank protection to the northward during December.

The release of a Fordson engine and hoist, from the extensive work in Puyallup Section, the forepart of the month, enabled it to be put in immediate operation of a drag-line scraper in the removal of gravel from the proposed course of Stuck River immediately above the Stuck River Highway Bridge. The gravel so removed is being placed as ballasting of a pile-brush bulkhead on the right bank of the river; and also, as filling behind said bulkhead. This is a programmed item of preliminary bank protection and river control work very essential to be carried out. At the same time it attains the lowering of the elevation of the river bed in that particular area.

It is programmed that an additional Fordson engine and hoist will be put into operation in this Section in driving pile-brush retards, just as soon as it can be released from the work in the Puyallup Section.

General conditions in this Section are fairly safe for the passage of freshet floods.

Works of great magnitude and apparent permanence and impregnability have been and may be erected in the Auburn Section, as a means of dependable stream control and bank protection. But

their utility and permanence will be nullified at a critical period of an extreme flood, bringing forward on its crest a mass of drift that might become lodged in this Section.

Such a lodgment can be reasonably conceived as a key to opening a break through into some one of the old courses of White River to the northward. This subject was seriously dealt with in my Annual Report for 1929. It is again repeated in this, because of the seriousness in my judgment of the menace described.

Floods of magnitude in past years have wrought great and swift changes in this area; and that too almost before my eyes. The many years of my personal contact with this area, combined with studies on this Improvement work have produced a due respect for the power of its floods of magnitude. The destructive changes that can be wrought by mass draft carried on flood crests and lodged at key points in this region is fully recognized and respected.

Low elevation of stream bed must be maintained in this Section, by the continued removal of excessive gravel flowing into it. At the same time must be continued the erection and maintenance of river control and bank protection works. These are eminently essential in the efforts to provide for the safe passage of floods of magnitude.

Because recent past years have been free from destructive freshets within the province of the Inter-County River Improvement, is no warrant to expect that destructive freshets will not again occur. It is a certainty that floods of portentous magnitude will

again occur, with more or less threatening or actual damage to agricultural lands and improvements to the northward of this Section.

Too great an emphasis can not be stressed as to the importance of this subject.

COUNTY LINE SECTION:

The month of December has been one of excellent progress in the removal of gravel from the desired course of Stuck River, by the operation of Diesel engine and hoist No. 1; and the placement of the gravel as ballasting of pile-brush retards as preliminary control works.

It was early in December, 1929, that this new power equipment was placed in operation in this Section, on the right bank of Stuck River. It has continued in operation since that time.

As stated in previous reports, the work of this gravel removal must be continued for an indeterminate future period. Nature having decreed that gravel flowing in vast volume from up-stream shall be deposited in this Section. This gravel must be as continuously removed, in order that the elevation of the bed of river may be kept as low as practicable. At the same time control and bank protection works must be constructed and maintained; in order to mould and govern the course of the river within certain prescrbed limits.

A Fordson engine and hoist was released, from the extensive work in Puyallup Section, during the forepart of December, and has since been in operation in this Section in driving a programmed

pile of bulkhead along right bank of Stuck River, just above Stewart Bridge. This is an item of preliminary control work.

General conditions in this Section are favorable for the passge of freshets.

DIERINGER SECTION:

The agreement entered into with the officials of the Puget Sound Power & Light Co., in respect to prevention of further erosion due to discharge into Stuck River of tail-water from the hydro-electric plant of said Company, and the resulting installation of control and bank protection works has rendered the subject in a satisfactory condition for the immediate future.

The levee and conrete revetment constructed during the summer and early fall, on the right bank adjoining the new Williams Bridge crossing of the Stuck River, has produced a fine piece of bank protection works of a permanent character.

The removal of excessive growth of brush in this Section has been accomplished.

Certain control works of a preliminary character, such as pile-brush retards and pile bulkheads, and also the extension of certain concrete-revetted levees must be carried into effect as has been programmed. This in order to mould and hold the river flow within this Section in reasonable control during freshets.

ROESLI SECTION:

Excepting for completion of ballasting of pile-brush retards and filling in between them on the left bank of Puyallup River,

just above and at confluence of Stuck River early this year, no further work has been done in this Section. These retards and bank protection work have demonstrated their designed effectiveness in aid of the control of the river at the confluence.

Additional preliminary bank protection and control works at the confluence of Stuck and Puyallup Rivers should be installed.

There is a large amount of concrete revetment work to be constructed before the highly valuable agricultural lands within this Section can be regarded as in a reasonably safe condition during the passage of floods of magnitude. The installation of these works should be programmed and constructed as early as practicable.

PUYALLUP SECTION:

The programmed extensive permanent item of fill and concrete revetted levee thereon, commenced during November,1929 on the right bank of Puyallup River, adjoining and extending done-stream from the Meridian Street Bridge has been in continuous construction during the year. Details as to its progress have been recited in my monthly reports. Nearly two thousand feet of levee faced with steel reinforced concrete revetment has been completed.

This item of permanent construction is being continued to a connection with existing old concrete revetment just below the site of the old Short Line Interurban Bridge. From now on to said connection, the magnitude of this work will be very much

lessened, as there will be no extensive fill necessary upon which to place the levee.

MURPHY SECTION:

A fine piece of permanent bank protection and river control work, of a little over a thousand feet in length, on the left bank of Puyallup River was completed the middle of September. This item of construction of two adjacent concrete revetted levees, commenced the middle of last March, closed an old sinuous channel entrance of the river. It is of a permanent type and a highly important protective work to a large area of very valuable agricultural land.

RESERVATION SECTION:

Other than the removal of certain excessive growth of brush, no other work has been done during the year in this Section; excepting that of building a few brush retards on the right bank of Puyallup River, about a half mile up-stream from the McAleer Road early last summer. Somewhat of a dangerous scour at the toe of a Section of old concrete revetment, footed upon badly decayed light lumber mattress, threatened the breaking through of the Puyallup River into its abandoned old river channel at that point.

This is an area of the river affected by the tides. The location and sinuousity of the old revetment of the right bank affords too wide a stream bed for the control of the river flow during low stage. The ebb and flow of the tides, united with the

river flow creates currents productive in building of bars and the deflection of the currents into scours; resulting in the above mentioned serious underpinning attacks upon the old mattress and revetment.

While considerable study with the Chief Engineer, Mr. Gronen, has been given this area, yet the magnitude of the works essential to properly and effectively place this reach on the river under adequate and permanent control urges further study before a program should be recommended.

In the meantime, the area must be watched and preliminary control methods installed as promptly as disturbing conditions develop.

GENERAL:

This fall and winter rains and snows in the upper reaches of the watersheds concerned do not forbode floods of magnitude during the winter and spring. The year has been an abnormally dry one. But the winter season may be regarded as just having started. One conjecture may be as reliable as another as to what will be the volume of floods to be carried off by the White, Stuck and Puyallup Rivers.

The authorization by your Hon. Commission for the purchase of Diesel engine and hoist No. 1 in 1929, and that of its duplicate in 1930, have since been demonstrated by the performance of these two 120 h.p. equipments as eminently wise and economical. Consideration and authorization is recommended to be given for the

purchase of an additional engine and hoist of about 80 h.p.capacity; to replace the use of one of the Fordsons. Economy in operation will flow from such action. It is costly in time and labor to utilize underpowered and high fuel cost equipment, on work of the magnitude and continuity demanded in certain phases of this Improvement.

My personal appreciation and many thanks are extended to your Hon. Commission for many courtesies and considerations accorded me at periodical times by your members in my efforts to carry out the responsibilities imposed upon me.

Incomplete, indeed, would be this report without an expression of my hearty appreciation to your Chief Engineer, Mr. H.F.Gronen, for the manifold aid and every-ready cooperation he has invariably given me. His long period of service in his capacity has enriched him with a knowledge of the requisite details of construction precedure in this particular work. It has rendered him peculiarly valuable for the important office he occupies.

Respectfully submitted,

Ernest B.Hussey,

Consulting Engineer.

EBH-H